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THE OFFICIAL U. S. ARMY MAGAZINE



## ARMY INFORMATION DIGEST

### THE OFFICIAL MAGAZINE of the DEPARTMENT OF THE ARMY

The mission of ARMY INFORMATION DIGEST is to keep personnel of the Army aware of trends and developments of professional concern.

THE DIGEST is published under supervision of the Army Chief of Information to provide timely and authoritative information on policies, plans, operations, and technical developments of the Department of the Army to the active Army, National Guard, and Army Reserve. It also serves as a vehicle for timely expression of the views of the Secretary of the Army and the Chief of Staff and assists in the achievement of information objectives of the Army.

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#### ASSOCIATE EDITORS

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Owen J. Remington

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GAINING GROUND is the soldier's immemorial mission. It may take him through surging surf and across beaches as described in "Combat Support for Amphibious Operations," or inching perilously up cliffs, as are the participants in Exercise Rio Selva shown on cover in training at the Jungle Warfare Training Center.

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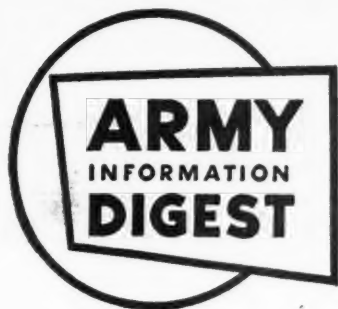
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For explanation of abbreviations used, see AR 320-50.



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Number 10

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At The Engineer Center, a newly activated organization concentrates on the priority task of

# COMBAT SUPPORT AMPHIBIOUS

AMPHIBIOUS operations have been a part of warfare since man first learned to build and sail ships. They will continue to be so until that distant date when the fantastic air vehicles conceived in present-day "science-fiction" become a reality.

Military history is replete with

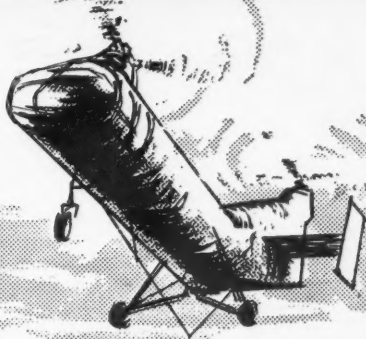
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MAJOR GENERAL E. C. ITSCHNER  
is Chief of Engineers, Department of the Army.





# RTFOR IBOUS OPERATIONS



**Major General E. C. Itschner**

accounts of amphibious operations, both opposed and unopposed. Generally, invasions involving unopposed landings have been successful whereas, prior to World War II, those meeting with determined opposition on the shore ended in disaster for the invader. Failures were seldom due to a lack of strength, valor, fighting ability or intensity of effort on the part of the invader. Instead, they usually

could be attributed to the omission of adequate and timely support for the landing force.

In amphibious operations there can be no partial victories or drawn battles. Once begun, the objective must be won.

The numerous successful amphibious operations in World War II and Korea attest to the Army's realization of the importance of support, and its ability to apply





### BEACHES CAN BE BARRIERS.

history's lessons in this regard.

Changing conditions of warfare bring about changes in tactics which are reflected in organizations and techniques for support. In conjunction with his normal mission, the Chief of Engineers is responsible for developing and recommending modernization of doctrine, training, policy, techniques and materiel for combat support of Army operations and assisting in like development of joint amphibious operations. As a major step in this direction, the 2d Engineer Amphibious Support Command has been activated at The Engineer Center, Fort Belvoir, Virginia.

WHAT is amphibious support, and what type of organization does it require?

Amphibious operations in modern war require highly complex and precisely timed planning. Amphibious support begins on the near shore concurrently with tactical planning and continues throughout the operation until a permanent

logistical organization is established in the beachhead. Support runs the gamut from staff planning assistance through amphibious indoctrination of units, embarkation, rehearsals and debarkation assistance, to the far shore provision of amphibian vehicular transportation for a portion of the assault force and complete combat support in the shore area. This definition is equally applicable to ship-to-shore or shore-to-shore operations.

Service support units, as compared to the divisions comprising a corps, require more coordination and supervision of their efforts, particularly in complex amphibious operations. A corps is inadequately staffed to perform this responsibility; therefore combat support and service troops must be combined into a provisional organization that is controlled and directed by a nucleus of trained personnel. Such an organization is known as a Shore Party. The beach itself is a barrier, normally fortified by additional man-made obstacles

over, through or around which the landing force must pass.

Since the breaching of barriers and other initial shore support are essentially engineer tasks, the Corps of Engineers is charged with the organization and command of Army shore parties.

The Engineer Amphibious Support Command (EASC) is a combat unit designed especially to form the nucleus for a corps shore party. It includes only a minimum of organic units, organized and trained especially for amphibious operations. These units contain certain skills and equipment not common to other Army units and, in addition, have specialized elements to control and direct the attached service units in the performance of their normal duties, but under the abnormal conditions and seeming confusion peculiar to an opposed amphibious landing.

As organized, the EASC contains only the minimum organic units for self-support and to provide the nu-

cleus of a shore party for a corps of five divisions. It provides the command framework for all organic and attached units when completely organized into basic battle group shore parties. It is flexible so that the shore parties may be organized either with balanced nuclei or "tailored" for a particular situation. It is capable of complete coordination of operations between shore parties.

Several types of organizational structures will provide these characteristics. *Figure 1* illustrates *one type* which is economical of manpower and yet retains the desired characteristics. It should be emphasized that this structure forms only the nucleus for a corps shore party and consists of about fifty per cent of its total strength. The balance is made up of attached units, the majority of which will eventually be integrated into the logistical organization scheduled to relieve the shore party when the combat phase is over.

#### ENGINEER AMPHIBIOUS SUPPORT COMMAND— (PROPOSED ORGANIZATION)

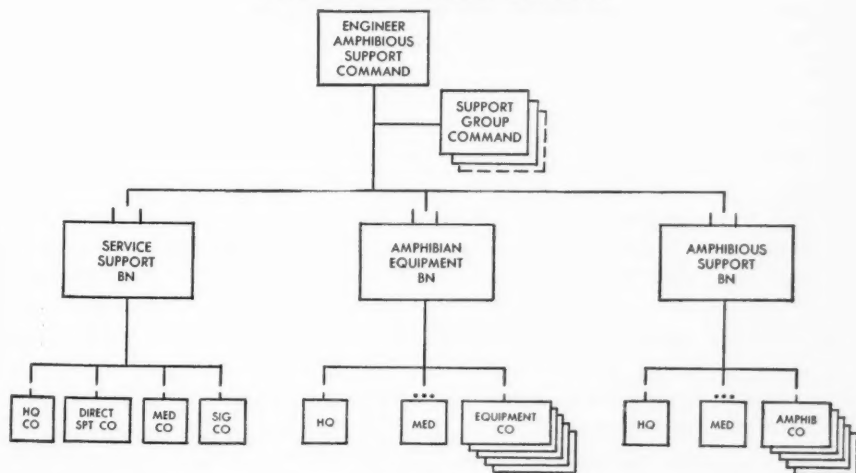


FIGURE 1





### TYPICAL DIVISION SHORE PARTY—ORGANIC AND ATTACHED UNITS (PROPOSED)

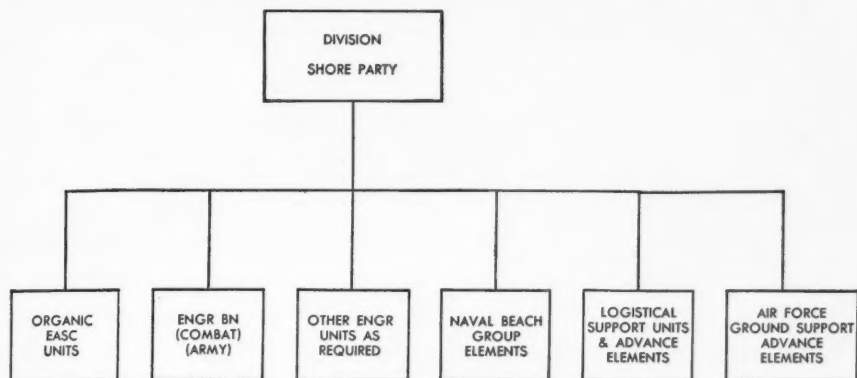


FIGURE 3

small EASC HEADQUARTERS contains two or three engineer amphibious group staff organizations, each of which may command and operationally supervise a division shore party in a division landing operation. Two additional provisional groups can be formed from the headquarters of the amphibian equipment and amphibious support battalions.

The EASC commander is the corps shore party commander and acts as special staff officer on amphibious matters. As a special staff officer and a commander of troops he holds the same relative position in the corps structure as the other special staff officers. The EASC staff is available to their counterparts on the corps staff for any advice or assistance required. The same principle applies to the staffs of division and battle group shore parties.

THE ENGINEER SERVICE SUPPORT BATTALION is composed of a headquarters, a headquarters company, a composite direct support com-

pany, a medical company and a signal company.

*Headquarters company* performs the usual mess, supply and transportation functions for the command. It also includes an aviation section equipped with helicopters and fixed wing aircraft for control, reconnaissance and liaison.

The *composite direct support company* furnishes third echelon maintenance and maintenance supply support for all equipment of the EASC except aircraft and signal. Contact teams can be furnished division shore parties as required. It also provides organizational maintenance for battalion.

Besides performing preventive medical service for the command, the *medical company* treats and evacuates command personnel, and operates aid stations in the shore support area for evacuation of casualties to off-shore medical facilities. It is organized to provide limited aid station facilities for each battle group shore party, and supervises any attached medical units.



EXITS FROM BEACHES ARE NOT ALWAYS THROUGH SAND DUNES.

The *signal company* installs, maintains and operates communication facilities for the command, the groups and the shore parties operating under the groups. Since command and coordination are possible only through adequate communications, this company is designed to provide complete communication service for all shore parties. In extreme situations, however, augmenting units will be attached and will be supervised and coordinated by this company.

The ENGINEER AMPHIBIAN EQUIPMENT BATTALION is composed of a headquarters, headquarters company and five amphibian equipment companies. The headquarters assists in the planning of all operations involving the use of its amphibian vehicles. The commander and staff are capable of performing the functions of an amphibious group in a division operation. The battalion provides tactical amphibious mobility to the landing force. It can transport the initial assault troops of five battle groups, with necessary shore party personnel, to

the hostile shore in a shore-to-shore operation and may assist in landing assault troops in a ship-to-shore operation.

After the initial assault mission has been completed, they may be employed by the tactical commander in support of infantry on limited objective attacks, assault river crossings, pursuit or used by the shore party for defensive missions, or to man cargo carriers or floating dumps.

The ENGINEER AMPHIBIOUS SUPPORT BATTALION consists of a headquarters, headquarters company and five amphibious support companies. In addition to the usual command and staff functions, the headquarters plans, directs, supervises and coordinates training and operations of organic units and assists in training of other shore party elements. When required, it performs the functions of a fourth amphibious group.

*Amphibious support companies* contain special equipment and amphibious skills. In addition to performing special operations, person-

nel are used to indoctrinate and advise other shore party units in amphibious techniques. One company is attached to each division shore party. The company is so organized that it can provide tailored skills and equipment for each battle group shore party.

Attachment of one or more *Engineer Battalions (Combat) (Army)* is essential for training purposes. When in an operational status, additional battalions must be attached to provide one line company per battle group shore party. When augmented with a company of the amphibious support battalion and signal and medical elements of the service battalion, the combat battalion becomes the principal combat support group of the division shore party.

#### FUNCTIONS OF EASC

THE greatest value of the EASC when attached to a corps is to give it amphibious capabilities. It does

this not only by virtue of special amphibious equipment, but by the addition of knowledge, skill, training and experience in amphibious operations.

EASC support starts on the near shore in giving sound staff advice to the corps, divisions and regimental staffs regarding the loading, embarkation and debarkation for an amphibious operation. It advises on the support capabilities of the shore parties and advises and assists in amphibious indoctrination and rehearsals of corps units.

WHILE variable, the sequence of activities during assault on a hostile shore habitually follows a general pattern — combat, combat support and logistical support.

Obviously, a beachhead must be captured and held before it can be developed and operated. With an Army landing force, this function is fulfilled by the three combat arms in teamwork with the combat

CONGESTION WHICH PROVIDES GOOD TARGETS MUST BE AVOIDED.



engineers and combat elements of the shore party, as required. The shore party, a composite task organization created for a specific operation and tailored to suit the conditions, provides combat and logistical support for the landing force. The EASC is the nucleus and command element of the shore party, and provides combat support with its organic units.

Second in sequence but equally as important as combat support is the EASC mission of supervision

ments is the responsibility of the landing force commander. To permit concentration on his tactical mission, he delegates supervision and control of beach support area activities to the shore party commander.

THE far shore combat support mission begins with the landing of the first assault troops. Amphibian vehicles of the EASC provide the landing force commander with water-land tactical mobility during



AMPHIBIAN BORNE TROOPS LEAD THE ASSAULT.

and control of logistical support. Until the beachhead is consolidated and the landing force commander dissolves the shore party, the logistical effort predominates.

Establishment of sea and air superiority, so essential to success of a joint amphibious operation, is the responsibility of the amphibious task force commander. The Navy is responsible for putting the landing force safely ashore. Once ashore, the operation of the assault troops and their support ele-

ments the initial assault and subsequent phases, until divisional vehicles are brought ashore. The shore party erects beach flank markers and unloading point markers as guides for succeeding waves.

To maintain momentum of the assault, the combat support elements of the shore party must rapidly breach mine fields, natural and man-made obstacles and barriers. Unloading ramps, jetties, beach matting and roads must be constructed so that vehicles and



wheeled weapons can be made available early to the assault force. Traffic patterns must be established. Control must be rigidly enforced to avoid congestion which would deny use of the vehicles to the assault and supporting forces and present lucrative targets for the enemy. Provisions must be made for emergency resupply of ammunition, rations and fuel, and for deployment or redeployment of dismounted assault troops by means of amphibian vehicles. It

up supplies. In addition, returned casualties must be collected and evacuated, prisoners must be guarded and evacuated, water points and information and communication centers must be established. The civilian population, if any, must be controlled and local security must be maintained.

In a joint operation, Naval Beach Group elements are assigned or attached to the shore party, as required, to perform such functions as maintaining commu-



#### LACK OF AMPHIBIAN VEHICLES REDUCES SHOCK ACTION OF ASSAULT.

may be necessary to place and maintain shallow water and land mine fields. The beach support area, too, must be defended.

Simultaneously, there must be supervision and regulation of the attached service troops in effecting discharge of ships' cargo and the receiving, sorting, storing and issuing of all classes of supply; delivery of supplies direct to combat units when necessary; and the preparation of dispersed areas for storage of emergency and build-

communications with naval components afloat, directing boat traffic, locating and marking navigational hazards, installing ponton causeways, salvaging and repairing landing craft, assisting in casualty evacuation, and assisting in underwater demolition of obstacles.

AS IN land warfare, the threat of the use of atomic weapons will undoubtedly dictate that amphibious operations adhere to the principle of dispersion and be con-

ducted over widely separated beaches. Shore parties attached to the battle groups will necessarily conduct their support operations independently of each other during early stages of an operation.

Physical consolidation of separate beaches, as in World War II, will not be the practice; but to attain efficiency, the control and coordination of subordinate shore parties will be centralized under the next higher shore party echelon as soon as possible through close-knit communication and liaison. The more favorable landing areas will be developed for logistical support purposes.

The appropriate Transportation Terminal Command and terminal service units form part of the shore party. Normally, advance staff elements of a logistical command are attached to the Engineer Amphibious Support Command and are integrated into the appropriate staff

section. This insures familiarity of the relieving logistical command with local conditions; it provides continuity in logistical operations, and enhances the orderly transfer of responsibilities from shore party to logistical command following the combat phase.

AIR-LANDED or air-dropped troops may be used in conjunction with amphibious landings. The extent and prevalence of airborne participation will increase as air transportation equipment improves. Possibly in the future, beachheads will be seized by airborne means, then reinforced and expanded by amphibious operations. With suitable attachments and airborne equipment, the EASC and shore party organization are flexible enough to provide the necessary combat and logistical support for this type of operation.

The EASC is neither designed

ROADWAYS ARE STRETCHED TO MEET THE LANDING STRIPS.





#### AMPHIBIAN VEHICLES FURNISH MEANS OF PURSUIT ON INLAND WATERWAYS.

nor intended to replace logistical commands or existing logistical units, nor is it organized to permit unlimited expansion. In addition to providing combat support, it is capable of performing pioneer logistical support in emergencies, and is organized, trained and equipped to coordinate and supervise all support activities under abnormal combat conditions.

Desirably, the transfer of logistical responsibilities and reassignment of attached logistical units should occur as soon as sufficient area has been secured to permit establishment of dispersed installations, and as soon as necessary facilities and deployments have been adequately developed.

Concurrently with the main assault landings, EASC elements may

perform combat and combat support functions along water-bound flanks in support of exploitation maneuvers, expansion of the objective area, or redeployment of combat forces. Specialized elements may perform infantry and combat engineer missions.

Elements of EASC—or upon dissolution of the shore party, the entire command—may continue inland to support crossings of water barriers. This capability actually enables the tactical commander to utilize bodies of water as avenues of approach. In the case of major river crossings, it allows the divisional combat engineer battalion to continue close support of the division assault units with minimum interruption or diversion of effort for river crossing operations.

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AN INDEX to the 1956 issues of ARMY INFORMATION DIGEST may be obtained free by addressing a request (indicating the number of copies desired) to The Editor, Army Information Digest, Cameron Station, Alexandria, Virginia.



## Radio Operated Robot Tractor

**BELIEVED** to be the first application of remote control to a piece of construction equipment, a robot tractor that can be operated by radio controls now is undergoing tests at the U. S. Army Research and Development Laboratories, Fort Belvoir, Virginia.

The tractor is expected to prove invaluable in construction work in radio-active-contaminated or combat zones where lives of men might be endangered. It also could be used in other

tasks such as fighting large fuel storage fires.

Capable of being operated from the ground or from helicopter or other aircraft, the tractor is controlled through a standard military radio transmitter and special control box. Normal operations can be performed up to about 15 miles, the practical range of the radio set, simply by manipulating buttons on the control box.

At present in tests the machine is operated through information relayed by a visual observer. It is possible that it may be equipped with a small television camera to allow for remote control without direct observation.

The prototype is a standard commercial "tornadozer" manufactured by LeTourneau-Westinghouse of Peoria, Illinois. Army Engineers have developed the control system and are completing the tests. Manual controls are retained for conventional operations at present.

*By manipulating buttons on control panel (left) which may be mounted in jeep or aircraft, the radio-operated robot tractor may be maneuvered at distances up to 15 miles.*







*Boat and accessories are carried to river bank.*



*Assault boat is unpacked from its carrying case.*

## Pneumatic Boat For Assault Missions

**LIGHTWEIGHT**, durable, capable of carrying 15 men, a new pneumatic type boat has been developed by the Corps of Engineers Research and Development Laboratories at Fort Belvoir, Virginia, and now is undergoing troop tests.

Weighing 255 pounds with equipment included, the boat is air dropable, and may easily be carried by six men. Due to weight and construction, a 2½-ton truck can carry twice as many of them as the conventional rigid type boats.

Constructed of neoprene-coated nylon, the boat consists of a main flota-

tion tube, an air-mat bottom, a thwart tube connecting the main flotation tube amidship, and a four-inch diameter spray rail.

The craft is equipped with two large and one small inflation-deflation pumps, a repair kit and 11 five-foot paddles. When inflated it is 17 feet long, five feet eight inches wide.

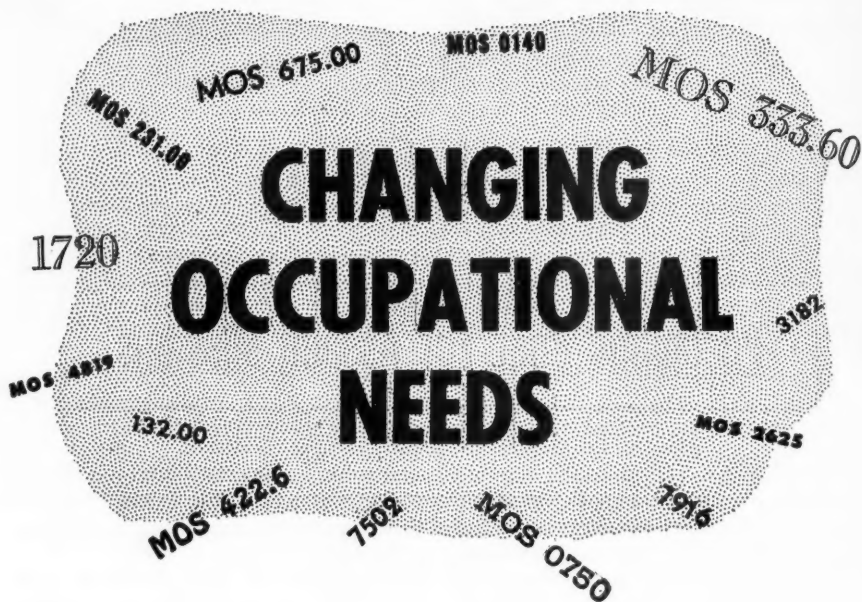
The main tube is divided into six compartments, four of which may be damaged without knocking out the boat. It can attain speeds of 7.1 miles an hour with a 25 horsepower outboard motor, or 3.3 miles by hand-paddling.

*Then it is inflated as crew assembles weapons.*

*A 25-horsepower outboard motor sends it on its way.*



**Jobs may be different—the structure of divisions may be altered—but with flexible adaptability the MOS system keeps the Army abreast of**



**Major William D. Meara**

- NUCLEAR power station operator—
- Automatic data processing system programmer—
- Guided missile installation electrician—
- Atomic radiation instrument repairman—

Even as recently as the Korean War, most of these occupations were unknown in the United States Army, or at most were merely topics of discussion as possible specialties in a far distant future.

*MAJOR WILLIAM D. MEARA, Armor, was formerly a member of Personnel Actions Branch, Office of the Deputy Chief of Staff for Personnel, Department of the Army.*

But in the swift rush of technology, that "far distant future" is being more swiftly telescoped into a very near tomorrow. In many instances, indeed, that tomorrow has arrived.

Thus the company clerk is being transformed into the automatic data processing systems programmer. The electrician becomes the electronic expert and possibly is being trained to operate the new atomic power plants that the Army soon will have in operation.

While these trends are especially true in the support areas, the development of new and more complex weapons also is working

changes in the occupational fields of the front-line combat soldier. Today's rifleman is becoming an expert in complexities of airborne warfare; the cannoneer may become a missileman; the tanker is using weapons that were on drawing boards five years ago.

Filling these new jobs with competent specialists demands sound training and personnel management, both sufficiently elastic and flexible to meet requirements of new and changing techniques and scientific advances. Actually, training and personnel management are interdependent, for a training program must be based on good personnel policies; at the same time, personnel management must make the best possible use of properly trained individuals.

FOR the Army, the picture is complicated by the fact that many of the existing occupations, as well as the new jobs, have few if any civilian counterparts. This means that the Army must classify the job activities, train men to fill them, and utilize proper management to insure greatest efficiency.

Further, the Army must accept into its ranks annually many thousands of men with little or no formal job experience or training—factors which a commercial civilian firm need not consider since it can be selective in its hiring. It is significant that the Army is able to train and utilize this raw material efficiently; indeed, it contributes substantially to the civilian economy by returning better educated and trained men to the civilian labor pool.

Aligning varied individual skills and aptitudes to particular occupa-

tional areas is a difficult and exacting process. This is accomplished by a system of classification and assignment based primarily upon the Military Occupational Specialty (MOS). This has been defined as "a grouping of duty positions possessing such close occupational or functional relationship that an optimal degree of interchangeability exists at any given level or skill."

Essentially, the Military Occupational Specialty System is composed of a code number used in planning for manpower needs and to designate individuals within the various occupations; and a specification, which is a description of the job to be filled. Part of the specification consists of a Standard of Grade Authorization which assists planners to determine grade structure authorized for various jobs.

By use of tables of organization or distribution, a commander knows exactly the numbers and occupations to be filled in his unit, and the various grades authorized for each of the occupations. To fill a vacancy ranging from private to highly trained leaders or technicians, he can call for the holder of a certain MOS in a certain grade. And he can be certain that the man who holds the MOS has been properly trained to fill the job.

Utilizing a decimal classification system, the MOS code consists of three basic digits and two suffix digits—that is, 000.00—to indicate the occupational area of the individual, major divisions of that area, the individual's military specialty, and the degree of advancement in skill or education within that specialty. (See chart.)

The first digit records the broad

ELEMENTS OF THE MOS CODE

|                       | 1st digit  | 2d digit | 3d digit | 4th digit (1st suffix) | 5th digit (2d suffix) |
|-----------------------|--|----------|----------|------------------------|-----------------------|
| OCCUPATIONAL AREA     | INITIAL CLASSIFICATION   |          |          |                        |                       |
| ENTRY GROUP           | ENTRY MOS TRAINING   |          |          |                        |                       |
| MOS                   | SPECIALTY IDENTIFICATION   |          |          |                        |                       |
| SKILL LEVEL           | IDENTIFICATION OF LEVELS OF SPECIALIZATION AND LEADERSHIP                    |          |          |                        |                       |
| SPECIAL QUALIFICATION | IDENTIFICATION OF PARACHUTISTS, SPECIAL FORCES, INSTRUCTORS, LINGUISTS, Etc. |          |          |                        |                       |

occupational area into which the job is classified—thus 1, combat arms; 2, electronics; 3, electrical maintenance; 4, precision maintenance; 5, military crafts; 6, motor maintenance; 7, clerical; 8, graphics; 9, general technical; and 0, special assignment.

The second digit represents an "entry group," or one of the major divisions of an occupational area. There are 49 of these groups which may be described as a group of related specialties requiring the same general basic skills.

The third digit, in combination with the first two, represents a specific military specialty without reference to any particular degree of skill. The job description is written for the three digit MOS level classification.

The fourth digit assists in determination of NCO or Specialist skill levels. As this digit increases, it indicates increased technical or leadership skills.

The fifth digit, in combination with the preceding four numbers, indicates special qualifications or individual qualifications not generally associated with a single MOS,

but which are common to a large number of diverse specialties. Among other types there are digits which identify instructors, linguists, Special Forces personnel, research abilities, parachute qualification.

Integral to the MOS is the specification—a type of job description which incorporates the title, code, authorized grade spread, and capabilities that the soldier must possess to fill a given position. This includes skills and knowledge, physical and mental requirements, and many other special prerequisites of the job. A specification thus serves as a ready reference for locating an appropriate MOS, as a means of classifying men and jobs, and as a guide for the establishment of Army school courses.

THE PROCESS of assigning or awarding an MOS begins with the individual's entry into the Army. An initial MOS may be awarded where the new soldier has had previous occupational training and still retains old skills—or in other cases where his civilian education has been at the college level in a scientific and professional category, as



set forth in AR 611-211. A prior serviceman may be awarded all the MOS's acquired during previous service provided he is currently qualified in them.

For most individuals, however, a preliminary series of tests known as the Army Classification Battery is given. These are designed to probe the aptitudes, education, occupational background, physical condition, interests and avocations of the individual.

During reception processing, each individual also undergoes the Motor Vehicle Driver Selection battery and, if required, certain clerical proficiency or language proficiency tests, or still others to determine his eligibility for Officer Candidate School.

Of great importance also at this time is the classification interview. Here a man's education, occupational background, interests and hobbies are evaluated to assist in making an original assignment. Subsequently, too, evaluations are made by military instructors and commanding officers.

Pertinent data derived from the tests and interview are recorded on DA Form 20, the Enlisted Qualification Record. A good indication now is available as to what potential the soldier holds for the Army.

OFTEN an individual's recent occupational experience or education may make him more fitted for certain military occupations than his score in a certain aptitude area. Sometimes a hobby may have been developed to such a proficiency that it is militarily important—carpentry, photography, radio operation, for instance.

Determining the most suitable

initial assignment for any soldier is not an easy matter. Rarely will aptitude test scores, education, civilian experience, hobbies and vocational history point to one particular job and to no other. Slight differences can mean much in individual cases.

As a rule, if there is an absence of applicable or significant experience or education (e.g., less than a year of significant work experience, or non-college graduate) the aptitude area having the highest score is considered most appropriate in determining a first assignment. But if the individual has a year or more of appropriate civilian job experience needed by the Army or is a college graduate with a degree in a scientific field, the man's training and job assignment will be along these lines.

RECORDS made at the reception station are reviewed during basic combat training, and as the individual progresses through the training cycle he is observed and evaluated by trainer personnel, both officer and enlisted.

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USE OF Universal Automatic Computers (UNIVAC) commonly known as a "mechanical brain," is aiding greatly in various phases of Army management—but the electronic device is only as smart as its programmer. If the set of instructions he prepares for UNIVAC should be incorrect, the "brain" would come up with the wrong solution.

Consequently highly trained soldiers are vitally important in this phase of Army activity. A skilled Electronic Computer Programmer (MOS 002) can solve in about three minutes a problem that would normally take one man an entire day to work out mathematically.

In the Army today, some 500 soldiers hold MOSs as Electronic Computer Programmers.

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These experienced soldiers are in a position to observe potentialities that frequently cannot be evaluated by any tests. The experienced noncommissioned officer recognizes leadership ability—or lack of it. Men are evaluated for their habits, good or bad, physical agility, stamina, aggressiveness, interest, and the ability to adjust to others and to Army life. Additionally the young soldier whose outlook is broadening, may decide to enter into some special field, or may express a desire for a particular type of training, such as Airborne or Ranger, or may aspire toward OCS. If so, he will be interviewed and his qualifications will be determined.

JUST PRIOR to completion of the basic training cycle, each trainee is evaluated and selected for appropriate MOS training,

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TYPICAL of the way in which new and different jobs are handled under the MOS system is the case of Master Sergeant Charles R. Feavyer, 37-year-old veteran of 18 years of Army service. Having completed the specialized course in Nuclear Engineering at the University of Virginia, he has been assigned to on-the-job training as a Nuclear Power Plant Operator at the Army's first Nuclear Power Plant at the Corps of Engineers Research and Development Laboratories, Fort Belvoir, Virginia. But because the job field is so new, it has not been given an MOS number, so he is classified as an 002, a Special Duty assignment. Seventeen others who took the same course have been assigned to Argonne National Laboratories, Chicago, and Arco, Idaho, both Atomic Energy Commission test installations. As this new job is studied, and its relations to civilian work are established, it will be processed to come under the MOS system.

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within Department of the Army training allocations and assignment quotas. Again the evaluation includes certain factors that will assist in insuring placement in an MOS commensurate with his capabilities. Trainer recommendations and physical limitations are factors here; only under exceptional circumstances will an individual be placed in an MOS when his physical profile is less than that required.

Following this evaluation, the soldier enters a school or on-the-job training suitable to the MOS for which he is being groomed. Upon concluding basic combat training he will enter a more advanced phase, and here will be awarded an entry MOS.

Commitments such as enlisting for a specific combat area, unit or school assignment or volunteering for Airborne or Ranger training, will be respected. Enlistment commitments, in fact, are important to a good recruiting program; if ignored or treated in cursory fashion, future recruiting possibilities are bound to suffer.

ONCE started along the path, more advanced training and schooling of the young soldier continues. Frequently, he may be assigned more than one MOS, depending on the scope of his training in or out of the Army. In any event the entire classification, training and educational system is closely interwoven with the assignment system; and the assignment system in turn is interrelated with established job requirements.

As constituted, the entire system is designed to be flexible enough to meet the varied needs imposed by changing conditions. This may

involve problems of overcrowding or shortages in some fields, or demands for the creation of entirely new jobs, or groups of jobs.

In the first instance, overcrowding is alleviated by retraining soldiers, whether enlisted or officer personnel, for different occupations. In the second, training facilities must be established which will produce personnel with the required MOS. It is a rare instance, however, when a newly created MOS has no close relationship with one already in existence. Thus mutual training often eliminates the necessity of establishing a completely new curriculum.

When such a new curriculum does become necessary, however, the machinery works smoothly within the existing framework of the MOS system—setting up the requirements, describing the job with its requirements and relationship to civilian jobs, and outlining the necessary training. In this way the Army sets up new job specialties in electronics, nuclear power, television, guided missiles and other highly technical scientific fields.

AS ARMY jobs become more complex, it is more important—and also more difficult—to determine who is and who is not qualified to perform a particular job. Consequently, in response to numerous suggestions from field commanders and NCO's, an enlisted MOS proficiency testing program is being established to provide uniform standards for determining an individual's qualifications to do a job and to promote the best qualified.

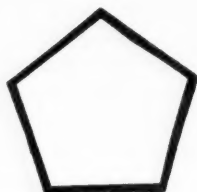
The testing is expected to fulfill a dual purpose—first, to enable the enlisted man to demonstrate his capacity and potential; second, to allow the commanding officer more opportunity to discover “under-qualified” soldiers in his unit.

At the same time, the program will give the enlisted man knowledge of what he should study to get ahead, and will indicate to the commander the various subjects to be emphasized in instructional programs.

ALL IN ALL, the MOS system is not a one-way street, since the individual as well as the Army benefits. The MOS description clearly tells the individual what is expected of him through description of duties, skills, physical and mental requirements. The forward-looking soldier can strive for progress along these lines to advance his career, and those who do not plan to remain in the service frequently can see a direct relationship between their military duties and a future civilian job.

Actions within the Army are constantly under way to revise MOS's to keep them abreast of new requirements, equipment, skills and the changing structure of the Army. The existing system has proven its ability to meet changing requirements realistically and effectively. Above all, it has concentrated information concerning the individual and the job into a simple but meaningful system, which outlines the path of progress for the individual soldier and points the way to increased effectiveness for the Army.

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# Pentagon C

**Lieutenant Colonel John F. Nicholas**

**A** FACT which chemists and physical scientists have long known—that proper preconditions of temperature, humidity, and even spatial relationships must be established before a reaction can be precipitated—has been translated into intensely human terms in the Pentagon.

Like the physicist's ionization chamber, this unique structure, located along the Potomac River near Washington, D. C., functions as a catalytic chamber where men, ideas, and the myriad minutiae of agency activities are brought into proper relationship to achieve one

all-important purpose: readiness for the instantaneous defense of the United States.

In many respects, the Pentagon functions in a manner not unlike a gigantic electronic "thinking" machine.

Here, within one building, are located the offices of the Secretary of Defense, Secretaries of the Army, Navy, and Air Force, the Joint Chiefs of Staff, and the staff personnel of the Army, Navy, and Air Force. Because of their proximity, they are able to communicate quickly and coordinate their activities with relative ease.

The Pentagon can receive messages, process and transmit them with a minimum time lapse. And it can do this with great efficiency

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**LIEUTENANT COLONEL JOHN F. NICHOLAS**, *General Staff*, is *Chief of Information, Military District of Washington, U. S. Army.*

for the widespread forces of the U. S. military establishment.

In the Pentagon is located the net control station for the Army Command and Administrative Network (ACAN) which is a gigantic around-the-world link of multi-channel circuits handling 50,000 originating messages a day (totaling about 7,500,000 words). This system is unmatched by any military communications network in history.

THE Pentagon also has trans-receivers—electronic data processing machines which form a net-

tronic and human; in electronic data processing machines; in millions of cataloged and filed documents and in the minds of its 30,000 staff personnel.

Records of all active Army personnel, for example, are maintained in the Adjutant General's Office Locator Service. This organization maintains over a million sets of records which, if stacked back to back, would cover eight miles, yet any particular individual's record can be located in a matter of minutes when required.

The accessibility and communicability of all this information is

# n Command Post

work that speeds the reporting of logistical requirements throughout key Army depots.

In the grand concourse is located a Military Affiliate Radio System Station (MARS). MARS, an organization of amateur radio operators who are interested in military radio communication, provides an auxiliary communications net of critical importance in emergencies.

Also, the Pentagon will soon place in operation the world's most powerful short wave transmitter, the "World Spanner." Fifty times more effective than the loudest commercial broadcasting station, it will be able to beam vital defense messages to any spot on earth, even through severe interference.

Within the Pentagon, information is stored in the actual "thinking" machines there, both elec-

tronic and human; in electronic data processing machines; in millions of cataloged and filed documents and in the minds of its 30,000 staff personnel.

BESIDES facilitating communications flow and control, the Pentagon aids creative thinking by establishing what corresponds to a group situation. Psychologists have found that "thinking teams" often solve problems with greater speed than when individuals attack problems separately. The stimulus of personalities upon one another is what is behind this phenomenon, as ideas create and draw forth new ideas. By virtue of its planning and arrangement, the Pentagon seems to have this "functionalism" built in. (CONTINUED ON P. 29.)





**Top Level Discussion.** In his Pentagon office, Secretary of the Army Wilber M. Brucker confers with Gen. Maxwell D. Taylor, Chief of Staff.

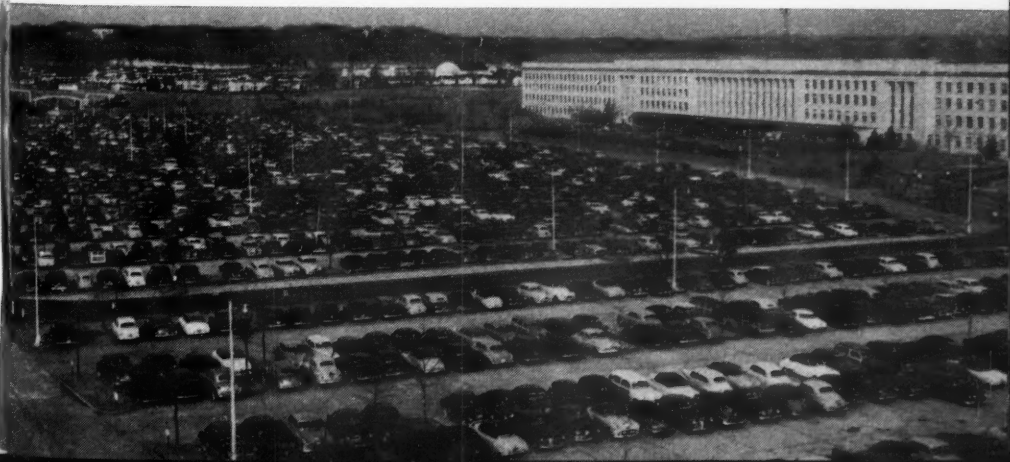


***To Presidential Meeting.*** Members of National Security Council take off from Heliport to attend top-level conference.

***Through Terrazzo Halls.*** The room number is your guide, indicating floor, ring and corridor.



***Employee Parking Lot at Pentagon*** provides space for thousands of cars.







**They Also Serve.** A staff of nearly 700 mans the three kitchens, two restaurants, six cafeterias, nine beverage bars.



**Communications Hub.** Transaction of vital defense business is speeded by thousands of calls daily through Pentagon switchboard.

**Files on Parade.** The Adjutant General's Office maintains more than a million active personnel records in its Pentagon files.







***River Approach.*** One of the two main entrances to the Pentagon, this portal fronts on the Potomac River.



***World Spanner.*** Army's new powerful transmitter, soon to go into service, can reach any part of the world.



Before the construction of the Pentagon, the old War Department occupied space in 17 different buildings scattered through Washington, D. C. and Alexandria, Virginia.

When it was necessary to have conferences, an elaborate and time-consuming series of steps was required, including scheduling and transportation, driving through Washington, D. C. and returning. Hours were lost that could have been used to better advantage.

Since the construction of the Pentagon, the world's largest office building, such conferences can be set up in minutes. Officers need merely step out into the corridor and walk down the hall to one of the Pentagon's numerous conference rooms to meet. Despite the vastness of the structure, no two offices are more than six minutes' walking time apart.

Completion of the Pentagon in 1943 added to the list of man-made wonders of the world. It has taken its place, along with the Sphinx, the Temple of Diana and the Great Pyramid as one of the most remarkable buildings of all time. It has almost three times the base area of the Great Pyramid and also dwarfs contemporary structures, having three times the office space of the Empire State Building and twice the area of Chicago's Merchandise Mart.

Its pentagonal shape was suggested by the outlines of the original filled-in land upon which it was to be built. And while the contours of the land site were subsequently changed, the shape was retained because of time limitations, because it was reminiscent of fortified towns of the Middle Ages and

because, with a configuration approaching the circle, it provides maximum area with shortest walk-distance.

Construction of the Pentagon building was started by the Army Corps of Engineers in September 1941, and completed in January 1943. It was designed and built in 16 months—a job that ordinarily would have taken four years. At one time, 13,000 workers were employed in its construction, working around the clock.

THE Pentagon occupies some 580 acres of space, of which 34 acres are devoted to the building itself. The area replaces what was once a mass of dumping grounds and shacks known as "Hell's Bottom."

Architecturally the building is austere and imposing. Its structural frame is steel and reinforced concrete, supported by more than 40,000 concrete piles. Except for the perimeter of Indiana limestone, all outside walls are of monolithic concrete construction. The stark simplicity contributes to the handsome, unified appearance of the building.

For one interested in architecture and the principles of design, the Pentagon is an outstanding example of functionalism on a gigantic scale. The Pentagon—which in Greek means "five-cornered"—is a five-sided building, consisting of five concentric rings which are laid out around a central courtyard and divided by spoke-like corridors. Because of this feature, any spot in the building can be reached by traversing the diameter.

Thirty miles of highway give access to the building. A complex

system of cloverleaves and 21 overpasses intermesh the five main routes of approach to the surrounding Washington area.

Parking areas around the building can accommodate 9200 vehicles and there is an underground motor pool and garage which house 150 vehicles.

Two bus companies operate almost 900 trips through the Pentagon's basement bus terminal per day. From this terminal, which can accommodate 25,000 passengers in one hour, twenty-one stairways lead up to the main concourse.

Reminiscent of Grand Central Station's concourse, the Pentagon contains a huge lobby 135 feet by 690 feet which houses an information booth, a dispensary, and shopping facilities comparable to those found in a fair sized city.

Among the stores and services available are: a uniform and tailoring shop, shoe-shine and repair shop, barber shop, jewelry store, newsstand, book store, camera store, drug store, department store, dry cleaning and laundry shop, bakery, flower shop, and post office. A telegraph office, airline and railroad ticket agency and credit union are also located here.

A RECENTLY installed "heliport" aids in connecting the Pentagon with surrounding installations and areas. This facility is for use by senior officers for important courier flights and emergencies.

Due to the Pentagon's proximity to the Washington National Airport, it was built low to the ground with only five floors, a mezzanine and a basement. Despite these limitations, it provides nearly

6,500,000 square feet of floor area, of which 3,700,000 square feet are used for office space.

Because vertical distances are used to reduce the horizontal ones, larger departments are often extended over different floors in the same area, rather than spreading out along corridors.

Movement within the building is facilitated by a system of wide ramps which rise gradually from floor to floor, and by 150 stairways, 19 escalators and many elevators.

The corridors on each floor are painted different colors, as an aid to visitors. The first floor is tan, the second green, the third red, the fourth gray, and the fifth blue.

The office numbering systems tell the floor, ring, corridor and room. Thus, to find room 3-C-138, one goes to the third floor, then to the "C" ring, then to room 138.

The Pentagon building is completely air-conditioned, with automatic controls providing a year-round temperature of 76 degrees and a relative humidity of 45 per cent.

In order to keep this building cool, thirteen 1000-horsepower refrigerator units, capable of cooling 32,000 gallons of water per minute, are maintained. Sixty engineers, working in eight control rooms, supervise this function.

The Pentagon building contains an auditorium, four motion picture projection rooms and a library with more than 160,000 books. It has 7600 windows, 65,000 light fixtures, 3,000 clocks, 550 water fountains, and 200 acres of lawns.

To maintain normal housekeeping operations, it requires a labor force of 600 persons, including carpenters, painters, electricians, sign

painters, locksmiths, elevator mechanics, pneumatic tube repair men.

THE Pentagon maintains the largest food-servicing operation in the world. The system is composed of six cafeterias, two restaurants with table service, nine beverage bars and snack bars, located throughout the building. A staff of almost 700 persons prepares and serves the 17,000 meals, 35,000 cups of coffee, 3800 quarts of milk and 7,000 soft drinks consumed daily.

Its telephone facilities which handle 280,000 phone calls a day cover 32,000 square feet of space, are serviced by the world's largest switchboard which handles more than 44,000 telephones. About 28,000 of these are located in the Pentagon proper; the remaining ones are located in 30-odd buildings throughout the Washington area.

THE structure cost 63 million dollars to build. The acquisition of land for the building and its approaches cost 7 million dollars while another 13 million was spent on the highway system for the building. Based upon the cost of similar office space in Washington the Pentagon has just about paid for itself in fourteen years.

WITH the advent of unification and the establishment of the Department of Defense in September 1947, the Pentagon became the Armed Services command post.

The Pentagon, which has taken its place in the imagination of the American people and, indeed, the world, is more than a collection of statistical superlatives; it is more than an expression of the oft-quoted American worship of the gigantic.

It is a reflection of the American genius for organization and efficiency. In serving as a monument to national defense it serves even more as a monument to peace.

The very existence of a Pentagon—its design the embodiment of stability and strength—is a durable example of the vast resources of men, machines and brain-power which the Nation is concentrating to assure the peace-maintaining power of the United States.

In recent years, when the destructive power of man has mushroomed to gigantic proportions, the Pentagon stands as a symbol of democracy's steadfastness and unity of purpose.

In an age in which there is "no place to hide," its role as a deterrent to aggression helps assure that there will be no "need" to hide.

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Highlighting "Project Paydirt," Secretary of the Army Wilber M. Brucker recently presented Exceptional Civilian Service and cash awards to six civilian employees at a Pentagon ceremony. A joint cash award of \$10,000—highest amount ever presented to Army civilian employees—went to Stanislaus F. Danko and Moe Abramson of Signal Corps Engineering Laboratories for developing a process of automation known as "Auto-semby" which it is estimated will save \$4,200,000 in the first year of operation. An award of \$1,275 went to Theodore E. Jasin, Ravenna Arsenal, Apco, Ohio, for a suggestion concerning a change in freight classification which resulted in saving \$1,055,000 for the government. Project Paydirt is a continuing program re-emphasizing the important benefits that civilian and military personnel can gain by submitting constructive ideas for improving efficiency of the Army.



## **Fast Facsimile for Photographs**

WITHIN five minutes after the camera shutter clicks, a photograph can be in the hands of a commander 40 miles away—or many hundreds of miles in a short time longer—through a new high-speed facsimile set developed by the Signal Engineering Laboratories, Fort Monmouth, New Jersey.

In this way vital military reconnaissance pictures can be rushed to command headquarters in time to affect critical decisions. Many commercial uses in the field of daily newspaper publishing also are foreseen.

The new facsimile, fastest of its kind in the world, combines high-speed picture sending techniques with Polaroid film that produces a finished print within a minute after exposure without need for a darkroom. The picture can be sent up to 40 miles by radio—or many thousands of miles over commercial telephone lines or long-range radio circuits. The new set fits easily into the back of a radio-equipped vehicle or can be airborne.

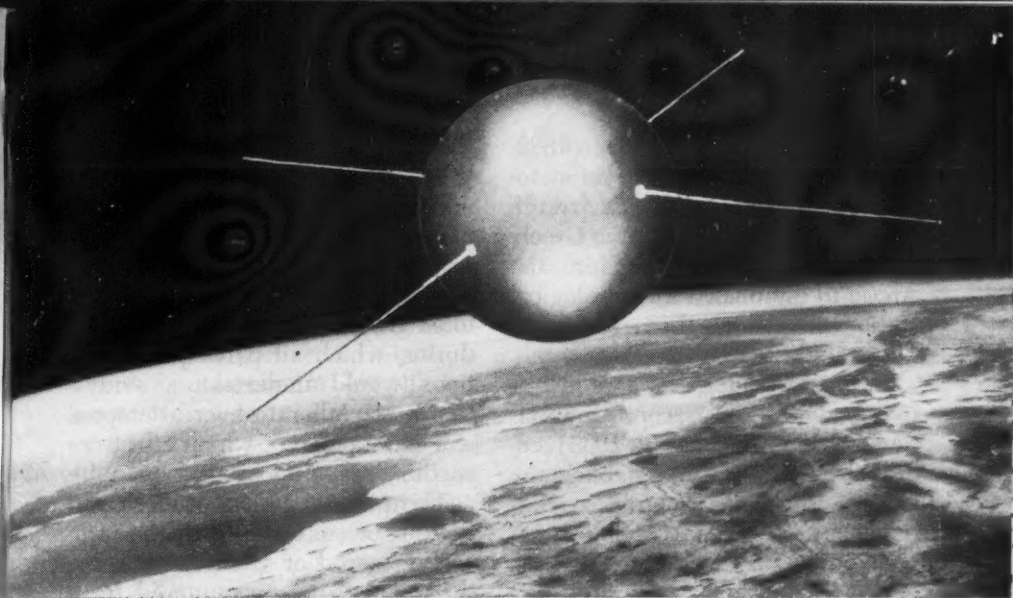
## **SIGNAL DEVELOPMENTS**

SOLAR batteries—thin silicon wafers that convert light to electricity—are being used in the new helmet radio now being developed by the Army. They also are being considered by Signal Corps scientists as sources of power for earth satellites.

In the new helmet radio, long narrow clusters of tiny cells are placed on both sides of the crown to power the radio for normal daylight operation. They charge four small nickel-cadmium storage batteries for night operation. Use of solar cells in this manner is expected to provide power for up to a year or longer. Experiments are so promising that similar power now is under serious consideration for the walkie-talkie and other lightweight field radios.

## **Solar Batteries Power Helmet Radio**





***Extending the Army's pioneering tradition from the terrestrial realm to the threshold of space, scientists push back the boundaries of the unknown as part of the***

# ARMY ROLE IN IGY RESEARCH

**Dr. Leonard S. Wilson**

**F**ROM earliest times, military leaders have been instrumental in the discovery and opening up of new horizons. Alexander the Great brought the northern shores of the Indian Ocean into the stream of European consciousness. Similarly, Caesar's campaign against Gaul carried present day political and cultural traditions into West-

ern Europe. In the Western Hemisphere, the early Spanish explorations of Cortez and Diaz led to the discovery and settlement of California long before the Pilgrims landed at Plymouth Rock. In our own country, the names of military leaders such as Fremont, Lewis and Clark are symbolic of the opening of the West.

Against this background of pioneering tradition, the U. S. Army in 1881 responded to a request of the organizing body of the First

*DR. LEONARD S. WILSON is Chief, Geophysical Sciences Branch, Office of Research, Office of the Chief of Research and Development, Department of the Army.*



International Polar Year (1882-1883) to establish an Arctic meteorological station. As a result, Lieutenant Adolphus W. Greely led his bold expedition into the Arctic to establish a meteorological station on the northern shores of Greenland.

Fifty years later, the administrative body of the Second International Polar Year (1932-1933) requested the Army to establish the College-Fairbanks Polar Year Station near the Arctic Circle. Again cooperating in basic research, the Army Signal Corps established communication facilities which connected this new station with other IPY observation posts and supplied the equipment to study problems of radio transmission.

THE current scientific program, known as the International Geophysical Year (IGY), is a logical outgrowth of the previous two International Polar Years. Originally scheduled at fifty-year intervals and devoted exclusively to polar research, the IPY program was overtaken by scientific advances which had resulted, in part, from research and development undertaken for defense purposes.

Meeting in 1951, the International Council of Scientific Unions (ICSU) took cognizance of the great advances in electronic instrumentation and high-speed electronic computers which had resulted from World War II research, and expanded the Polar Year Program into a world-wide activity which would delve into the mechanics and processes which affect the earth and its atmospheric envelope.

At this time, the ICSU established the Comité Spécial de l'Année Géophysique Internationale (CSAGI) to plan the new International Geophysical Year. CSAGI designated the period 1 July 1957 to 31 December 1958 as the period during which all participating nations would undertake a study—the most elaborate ever attempted—of natural forces which affect the earth.

The precise period was selected because it coincides with the forecasted period of greatest solar disturbances to be encountered for a number of years. However, the decision to reduce the interval from 50 to 25 years was made deliberately to capitalize on electronic and computer developments.

Each participating nation has, in turn, established a National Committee for the International Geophysical Year. In the United States, the National Committee for the International Geophysical Year (USNC-IGY), established in the National Academy of Sciences, is funded by a \$39,000,000 grant from the Congress to the National Science Foundation.

Financial support alone, however, does not assure success. A large number of public and private scientific institutions are cooperating in the IGY program and many of the capabilities and a considerable amount of scientific know-how resides in the operational and research and development capabilities of the Army, Navy and Air Force. At the request of the Director of the Budget, the Assistant Secretary of Defense (Research and Development) Coordinating Committee on General Sciences (CCGS) reviewed the proposed

program and determined that most of the IGY program was of interest to the Armed Forces.

In May 1954, the Assistant Secretary of Defense (R&D) stated that Defense Department agencies would cooperate with the USNC-IGY by a small increase in budgetary commitments for geophysical research and by making available certain equipment and logistical support, particularly in remote areas such as the polar regions. Participation by the armed services along these lines was approved in November 1954. To implement this action, the Army Chief of Staff assigned monitorship of the Army's participation to the Deputy Chief of Staff for Military Operations.

At about the same time, the USNC-IGY was organizing its Technical Panels which have responsibility for scientific investigations in thirteen major research fields—Aurora and Airglow, Cosmic Rays, Earth Satellite Program, Geomagnetism, Glaciology, Ionospheric Physics, Longitude and Latitude, Meteorology, Rocket Exploration of the Upper Atmosphere, Oceanography, Seismology and Gravity, Solar Activity, and World Days and Communications.

Army scientists are members of Technical Panels on Oceanography, Glaciology, Ionospheric Physics, Rocket Exploration, as well as committees on the Arctic and Antarctic. These elements of USNC-IGY plan and review experiments which are proposed by the United States scientific fraternity for inclusion in the IGY program.

The various IGY technical programs are designed to gain more information about the natural phe-

nomena which affect the surface on which man lives. The Army, perhaps to a greater degree than any other organization, is faced with the problems of adjustment to all types of environment. Recognition of this fact was fundamental to the decision to participate in IGY.

At first glance many of the IGY programs may appear to be far removed from the combat soldier's daily existence. Each, however, is fundamental to the solution of a particular Army problem, stemming from the environmental conditions in which soldiers live and fight. The following are brief discussions of the various IGY programs and the part played in them by the U. S. Army.

**Aurora and Airglow.** These phenomena occur at altitudes in excess of 36 miles and appear as "Northern Lights" or *Aurora Borealis*. Similar phenomena, known as *Aurora Australis*, occur in the Antarctic. Composed of atoms and molecules which are energized by streams of ions emitted by the sun, both aurora and airglow interfere with radio communications.

As part of IGY studies, spectroscopic, visual photographic and radar observations will be made at approximately 80 stations established at strategic points. It is anticipated that deviation, extent and duration of these displays, as well as other significant information, will be derived from these worldwide observations. Of major significance is the possibility that the "lights" occur simultaneously in the Arctic and Antarctic. The Signal Corps is participating in the program through contracts with the

University of Alaska and Cornell University.

**Cosmic Rays.** Although the existence of cosmic rays has been known for several decades, their content and effect are not fully known. Scientists believe that primary cosmic rays are streams of electrically charged particles which may indicate the presence of very high energy potentials in outer space.

During the IGY, simultaneous rocket and balloon flights will be made from a widely dispersed global network of stations to measure energy and mass of cosmic radiation particles and possible relationships of the intensity of cosmic ray bombardment to the earth's geomagnetic field. Rocket firings by Army Ordnance as well as Signal Corps balloon flights and instrumentation will be used to collect some of the desired information.

**Earth Satellite.** "Several earnest tries" will be made to launch the first artificial earth satellite. The launching, known as Project Vanguard, has been established in the Department of Defense, with the Navy assigned management responsibility for the three services.

Vanguard will be a three-stage rocket, 70 feet long, 45 inches in diameter, and weighing 22,000 pounds—all designed to carry a 21.5 pound satellite aloft. When the third stage reaches an altitude of 200 to 300 miles and attains a speed of 18,000 miles per hour, the satellite will be detached from the third stage of the rocket and directed into its orbit about the earth.

The first satellite will be a mag-

nesium ball, measuring approximately 20 inches in diameter and weighing approximately 21.5 pounds. About half of its total weight will consist of scientific instruments and the radio telemetering system. Two Army-sponsored experiments have been tentatively accepted for further development and study—the Signal Corps' Albedo or brightness experiment designed to measure the relative amount of light reflected from the earth, and the Ordnance Corps study of ionospheric propagation.

In support of the IGY earth satellite program, the Corps of Engineers will establish tracking stations at Santiago and Antofagasta, Chile; Lima, Peru; Quito, Ecuador; Havana, Cuba; and Fort Stewart, Georgia. The Signal Corps will install and operate fourteen Mini-tracking communications circuits linking the above stations with the Earth Satellite Control Center and the Pentagon Army Communications Center.

**Glaciology.** Investigations of glacial ice will be undertaken in the Arctic and Antarctic regions. Study of movement, structure, composition and internal thermal conditions will contribute to a greater understanding of present glaciers as well as conditions under which previous glacial epochs took place.

In support of glaciological research, the Snow, Ice and Permafrost Research Establishment (SIPRE) of the Corps of Engineers conducted a field seminar for glaciologists from seven countries as a major step toward standardizing observation techniques.

In addition, SIPRE will drill a test hole 1000 to 1500 feet deep in

Antarctica, and analyze the resulting cores to determine quantities and qualities of snow which have been deposited during past centuries. Marking a logical extension of research which SIPRE has been carrying on in Greenland since 1954, this project will seek to correlate Arctic and Antarctic snowfall records to determine what relationships, if any, exist between precipitation in the polar regions.

In addition to the scientific program in which the Army has an important role, the IGY Antarctic Program has benefited from developments which have resulted from the Army Greenland Research Program. Already studies have been conducted on the load-bearing quality of snow, construction of snow compacted runways, crevasse detection, trail blazing and trail-marking techniques, lightweight trail rations and cold weather gear.

Army polar specialists have been made available to supervise snow compacted runway construction, and surface hauling of equipment. Dr. Paul Siple, Director of Basic Sciences Research in the Office of the Army Chief of Research and Development, is serving as Station Scientific Leader of the Amundsen-Scott South Pole Station.

**Ionospheric Physics.** Investigation of the ionospheric layer will be increased by 50 percent during the IGY. Altitude of the ionospheric layer, the gases composing it, and its effect on radio transmission will be studied. Measurements will be taken at regular sounding stations and initial soundings will be taken in Antarctica. The Signal Corps will use its exist-



*This Aerobee launching facility at Fort Churchill was rushed to completion in time for use during International Geophysical Year.*

ing circuits as well as newly established ones to observe ionospheric interference. Signal Corps ionosonde stations will be operated in the United States, Alaska, Greenland, Newfoundland, on an Arctic Ocean ice floe, and in Okinawa.

**Longitude and Latitude Studies.** From a global viewpoint, man's knowledge of the location of places on the surface of the earth is far less precise than is commonly supposed. The exact distance separating North America from Europe, for example, is not known, nor are many other vital global space relationships.

Through the use of radar sightings of the satellite and simultaneous photographic "fixes" of the moon and surrounding stars by special cameras from a number of stations, greater accuracy of location can be determined. The Army Map Service is participating in order to locate more accurately the major island groups in the Pacific.

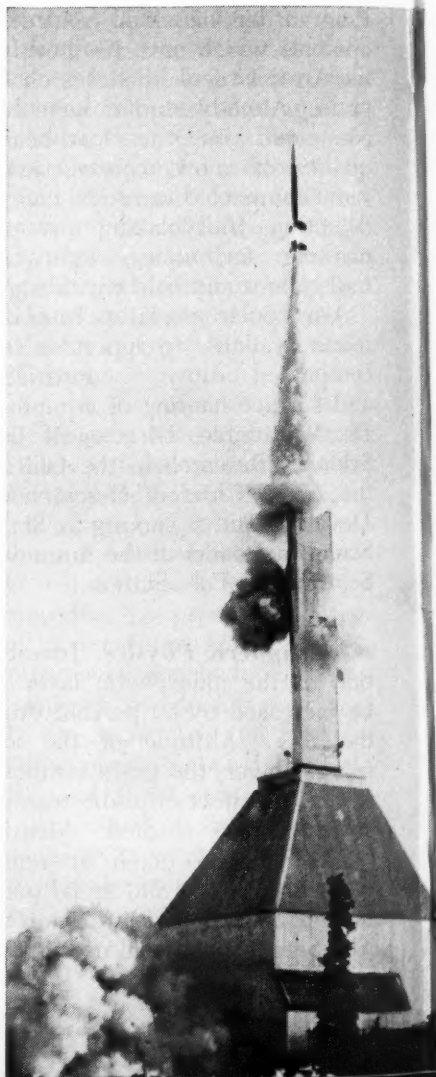
**Meteorology.** The IGY will make possible a great expansion in meteorological observation stations in the Southern Hemisphere. Some 60 IGY stations will be established in the Antarctic alone. For the first time a daily weather map will be prepared in the Antarctic.

World-wide, emphasis in the meteorology program will focus on observations to altitudes of 100,000 feet. Radiosonde balloon soundings will measure and report pressure, wind direction and velocity, temperature and humidity. The Signal Corps is furnishing Army equipment and will make observations at Fort Churchill.

**Rocket Exploration of the Upper Atmosphere.** Under this, the largest IGY program assigned to the Department of the Army by the Secretary of Defense, the Army is responsible for establishment and operation of a rocket launching facility at Fort Churchill, Canada. The task is being monitored by the Army Chief of Research and Development. Construction is assigned to the Corps of Engineers, operation to the Ordnance Corps, and logistical support to the Military District of Washington. Monitorship is retained in the Office, Chief of Research and Development.

As part of the quest for more accurate information about the earth's atmospheric envelope, the exercise will include measurement of pressure, temperature, density, and wind. Particle scatter and radiation will also be studied. Special instruments in the nose cones of rockets to be launched at Fort Churchill by scientists from the

Army, Navy, Air Force and several universities, will provide detailed reports on atmospheric conditions. The results will have significant effect on developments in long-range weather forecasting, high-altitude flight and navigation and radio transmission. Approximately 200 research rockets (Aero-bee Hi and Nike-Cajun) will be launched during the IGY. About 500 different instrumented observations will be obtained.





A Sounding Rocket Unit (Provisional) with a complement of approximately 80 has been organized under the command of Lt. Col. Lloyd G. Smith of the Ordnance Corps Ballistics Research Laboratory. Communications, radar, and meteorological elements will be provided by the Signal Corps, ballistic instrumentation by Ordnance Corps. A Rocket Handling and Firing Team will be furnished by the Navy.

The rocket launching facility at Fort Churchill was built by Engineer Task Force 87 during the period May-August 1956. The project, dedicated by Lt. Gen. James M. Gavin, Chief of Research and Development, and Dr. Joseph Kaplan, Chairman of the U. S. National Committee for the International Geophysical Year, on 30 October 1956 has been the scene of recent test launchings.

While the major effort is being

## Shooting the Breeze by Rocket and Gun

STUDIES of high altitude wind currents and of low level ground winds now are being conducted by the Army, using two different types of equipment, under direction of the U. S. Army Signal Corps.

IN studies of high altitude winds, the Army now is firing high altitude rockets from Fort Churchill, in northern Canada, to map the north wind near its source. Other similar tests have been made at White Sands Proving Ground, New Mexico, while another series will take place at Guam during the 1957-58 International Geophysical Year.

Ten launchings of specially equipped Aerobee rockets will be made from the top of the world to study precise direction, speed and temperature of icy winds responsible for winter cold spells. Ascending to 80 miles, the Aerobees spray 18 packets of high explosives into the air at pre-set intervals. The charges are recorded by sensitive instruments on the ground to provide vital facts concerning the winds.

IN LOW ALTITUDE wind studies, tests are now under way of a weather gun that shoots a steel ball

into the wind at an angle calculated to make the ball fall back close to the gun's muzzle. A check of the gun's angle of tilt with a calibration chart provides a reading of wind velocity.

Known as a Shooting Sphere Anemometer, or unofficially as the "breeze buster," the device is expected to offer many advantages over the pilot weather balloons now used for low-level wind measurement. It can be employed under poor visibility conditions and can measure velocity up to gale force. It also is expected to provide data more quickly than balloons. Exhaustive tests now are being carried out by scientists of the Signal Engineering Laboratories at Fort Monmouth, New Jersey.



conducted at Fort Churchill, secondary launchings will also take place at White Sands Proving Ground, Guam, and several other sites. In this way, simultaneous observations will be made in the Arctic, mid-latitudes and tropics.

**World Days and Communications.** Throughout the 18-month International Geophysical Year, there will be four categories of World Days during which special observations will be made:

REGULAR WORLD DAYS will be held during two days at New Moon, two days at Full Moon, and at unspecified times when prominent meteor showers are forecast.

ALERTS will be announced throughout the world when unusual solar "flares" are expected.

Whenever strong geomagnetic disturbances are anticipated, SPECIAL WORLD INTERVALS will be held on 24-hour notice by the World Warning Agency located in the National Bureau of Standards Radio Forecasting Center, Fort Belvoir, Virginia.

WORLD METEOROLOGICAL INTERVALS will be scheduled for 10 days during each quarter. They will include the vernal and autumnal equinoxes and summer and winter solstices as well as Regular World Days.

REPRESENTING the most ambitious program man has yet devised to study his planet, the IGY is expected to furnish sufficient raw data to keep geophysicists

fully occupied for several decades. And although the findings may be considered primarily of fundamental scientific interest, Army participation in the program is dictated by certain very practical considerations.

As a leading scientific organization, the Army is primarily concerned with those aspects of science which directly affect ability to discharge its mission. In this connection, the IGY's basic program furnishes information directly applicable to many meteorological, mapping and mobility problems.

At the same time, participation by Army scientific personnel is helping to accomplish the scientific purposes of the IGY by providing a broad range of developed skills and equipment normally unobtainable from other sources.

The majority of IGY experiments are of significance to the Army and would eventually have to be accomplished to meet an Army need. The IGY cooperative ventures are expected to furnish some of this data many years before the Army could obtain it through its own resources.

Finally, while the fund of world scientific knowledge and Army operations, too, stand to benefit materially from the research now under way, ultimately it is the individual citizen who will find his mode of life transformed and his outlook immeasurably broadened by many of the pioneering advances now in process.

Exercise Rio Selva teaches lessons in

# Meeting the Jungle CHALLENGE

Lieutenant Colonel Merlin H. Parson

ONLY moments before, the Panama jungle had lain in drowsy, pre-dawn silence. Now a series of jarring explosions rocked the Fort Sherman billeting area. Machine guns, mounted on careening jeeps, flashed in the darkness, spraying buildings with blank fire.

"Invading aggressor force threatening the Fort . . . already in control of Gatun locks . . . prepare to move into the field immediately." The commandant's terse telephone message alerted leaders of a battalion combat team from the 82d Airborne Division. More than 1000 paratroopers, blasted from sleep, took up weapons to begin the final phase of jungle training in the Canal Zone.

This was the dramatic beginning of Rio Selva, a six-day battalion field exercise which climaxed a five-week schedule of realistic training in jungle warfare.

AS World War II operations in

**LIEUTENANT COLONEL MERLIN H. PARSON**, Infantry, is Commanding Officer, 2d Battalion, 325th Airborne Infantry Regiment, 82d Airborne Division, Fort Bragg, North Carolina.

the Pacific so starkly demonstrated, a soldier fighting in the tropics has not one but two enemies—the relentless human foe and the encompassing jungle. A soldier or a unit cannot be marched into the unfamiliar and forbidding tangle and expected to achieve a high degree of immediate success. Techniques

*Patrolling paratroopers study a possible cliff-top ambush site during small unit tactical training.*



of survival and jungle warfare must first be mastered.

Recognizing this need, the 82d Airborne Division in recent months has provided training grounds for its units ranging from the polar ice cap to the steaming equatorial jungle. In the March 1956 experimental tactical exercise Arctic Night, a combat team of the 504th Airborne Infantry parachuted 700-strong onto the arctic waste near Thule, Greenland, only 800 miles from the North Pole. As the first combat-ready battalion team to train in the arctic, the troopers operated twenty-one days on the wind-swept, sub-zero snow plain, while effects of severe cold on men and equipment were studied. (See "Farthest North Airdrop," October 1956 DIGEST.)

Troopers were still thawing from Arctic Night when U. S. Conti-

*A Pathfinder patrol probes deep into Aggressor territory on a reconnaissance mission.*



ental Army Command planners again called upon the 82d to participate in special training—this time a jungle operation called Rio Selva. In preparation for the Canal Zone exercise, all of the 325th Airborne Infantry Regiment's incoming trainees were channeled to the 2d Battalion, where they were integrated into squads and platoons for advanced individual training. Four hundred of the newly assigned men went through the Basic Airborne Course, where they earned their wings together. A battalion mass jump and pre-departure instruction in map and compass reading, communications, heavy-rigging and air transportability brought the combat team to a fine edge of preparedness for the jungle training.

A 1000-man battalion combat team—consisting of the 2d Battalion, 325th Airborne Infantry Regiment and attached units—was airlifted to the Canal Zone for indoctrination at the Jungle Warfare Training Center (JWTC).

JWTC has been operative since 1953. Occupying an irregular plot of land on the Atlantic side of the isthmus, approximately seven miles wide and twelve miles long, it includes the Fort Sherman Military Reservation and adjacent areas licensed by the Canal Zone government. (See "Sentry to the South," December 1955 DIGEST.)

On the east is Limon Bay, which separates Fort Sherman from the cities of Colon, Republic of Panama and Cristobal. To the west and north is the Caribbean Sea.

Only three roadways traverse the heavily overgrown training area. Here a vexing, close-woven net of

trees and vines stretches across a seemingly endless patchwork of uncharted streams and rivers, bogs and precipitous cliffs. Poisonous reptiles and insects and wild animals abound.

Preliminary orientation classes at JWTC armed the troopers with the basic principles of jungle survival. They learned to identify nourishing and toxic plant life and to recognize dangerous snakes and wild animals.

Application of fundamental techniques of navigation, firing and cross-country movement must be modified to fit jungle conditions, the troopers learned. Visibility shrinks to a minimum and the compass becomes a vital necessity to all units, from patrol to battalion level.

For simple reconnaissance and observation missions, the thickness of the jungle is actually an advantage. Units are seriously hampered in walking through the underbrush, but a man on his stomach can crawl undetected under the dense growth to within inches of the enemy.

The artilleryman's problems, too, are often magnified in the jungle. Heavy foliage is a vital consideration in selection of gun positions. More than ever, movement is restricted to existing roads and trails.

Included in the BCT was a battery from 82d Division Artillery. When possible, missions were fired with the gun remaining on the trail. When that was not practicable, it often required as much as several hours of labor with machete and axe to carve a position from the leafy wall.

The most efficient fire adjustment was through a ground-air ob-



*Paratroopers traverse a hasty rope bridge during training in obstacle crossing at Jungle Warfare Training Center.*

server team. The man on the ground could locate targets invisible from a plane, while the aerial observer adjusted fire, reducing the number of "lost" rounds.

AT JWTC, troopers learned how to overcome the jungle's many obstacles—impassable tangles of fallen trees and vines and sudden, yawning gorges or black water. They teetered on precarious rope bridges hastily strung over swift streams. Clinging to the face of a sheer cliff, they practiced newly learned skills in rappeling.

Communications, the pulse of any military operation, took on new dimensions of difficulty. Wire has to be played out tediously from back packs; climbing spikes became standard equipment as radio antenna sprouted from the tops of tall trees.

Subsequent weeks brought prob-



lems in squad, platoon and company tactics — attack, defense, reconnaissance and raid. In one raiding foray, F Company was beach-landed in the early morning darkness and advanced 3,000 yards through the choking jungle to stage a surprise attack which "liberated" an Aggressor PW compound. Six prisoners were evacuated by helicopter, thirty-seven others on foot, as the company retired swiftly to friendly lines.

THE realistic six-day battalion field exercise, which began with the detonation of hidden explosive charges at 0430 hours 12 May, brought into play all previous phases of training. The combat team hacked through eighteen miles of rugged jungle and crossed the deep and forbidding Chagres River to reach the Aggressor and accomplish its mission.

"Warfare" ended when the Ag-

gressor commander, finding his last avenue of retreat cut off, walked into a jungle clearing to surrender his ragged handful of men.

At the problem's conclusion, officers and men of the BCT agreed that the jungle training had proven a real measure of their endurance and determination.

The JWTC cycle completed, the Battalion Combat Team moved its base of operations to the Pacific side of the isthmus, at Fort Clayton, in preparation for the Joint Exercise Carib-Ex.

WITH forethought and purpose, the battle readiness of the 82d Airborne is being tempered in climatic extremes. Increasingly it is recognized that the soldier often must fight a double battle—against the enemy and the terrain. Exercise Arctic Night proved conclusively that properly trained parachutists, given adequate equipment, could

*As part of a company raid problem these troopers selected a route designed to circumvent Aggressor patrols.*





*The battalion field problem ended with closing of a trap on Aggressor forces in jungle clearing near Gatun Dam.*

stage an effective airborne operation even in the sub-zero polar cold. And now, more recently, Rio Selva, a tropical counterpart, further demonstrated the airborne division's flexibility.

Exercises such as Arctic Night and Rio Selva are proving a sound

investment in United States' military future. Such training enables our forces to eliminate one foe—the weather and terrain—by making it an ally, thus allowing the soldier to concentrate on his primary mission—the overwhelming defeat of any possible aggressor.

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SEEKING a general utility vehicle that can travel up to 50 miles per hour, stay in the air for several hours, and carry a thousand-pound load, the Army has awarded contracts to three different corporations for research and development of an "aerial jeep." Such a vehicle could overcome road and terrain restrictions and would not need airplane landing strips. If the venture is successful, the concept could lead to eventual development of an often-discussed "aerial truck."

Recent developments in direct lift devices using the ducted propeller, improved power plant designs, and advances in vertical take-off research have contributed to the Army's decision to proceed with plans for an aerial jeep. The three companies involved will perform experiments in different configurations of ducted propellers and control systems. They are the Aerophysics Development Corporation, Santa Barbara, California; Chrysler Corporation, Detroit; and the Piasecki Helicopter Corporation, Philadelphia.



# PARAGRAPHS

from



## The Pentagon and the Field

The Department of the Army will have mobilization cognizance over a new guided missile and small weapons facility now being built by the Martin Company near Orlando, Florida. It will be the country's first privately owned and financed major aircraft industry plant to be put under Army supervision. "Mobilization cognizance" is a term used to describe a situation where one service is given the responsibility for scheduling all mobilization defense production in a specific plant. Martin technicians are already turning out Lacrosse field artillery guided missiles for the Army at Orlando.



*First of a series of field training exercises for Fiscal Year 1958, Exercise All-American is scheduled for Fort Bragg, North Carolina, during 15 days in November. About 19,000 troops will take part.*



General Lyman L. Lemnitzer has succeeded General Williston B. Palmer as Vice Chief of Staff, U. S. Army. General Palmer has been assigned as Deputy Commander-in-Chief, European Command. General Lemnitzer was Commander-in-Chief of the Far East Command and the United Nations Command from June 1955 to 1 July 1957.



*A new course in the basic applications of the Automatic Data Processing System has been started for field grade officers and key civilians from all elements of the Department of the Army at the Signal School, Fort Monmouth, New Jersey. Expected to have future far-reaching military uses, the system makes possible the processing of large amounts*

*of technical and administrative data at electronic speeds, storing of voluminous information, as well as almost instant computations on target acquisition.*



A new Army Green winter uniform for members of the Women's Army Corps, Army Nurse Corps and Medical Specialist Corps has been adopted but will not be worn generally until 1961. A modification of the taupe Hattie Carnegie design now worn, it is made of wool serge, with single-breasted, open collar, four-button jacket with matching six-gored skirt. Accessories will be black.



*Research into the four-rotor helicopter concept, commonly called "Quadrotor," is being undertaken under Department of the Army contract with Convertawings, Inc., of Amityville, Long Island. In the quadrotor, four smaller rotors replace the one or two large ones normally used to lift the helicopter. Studies are being made to determine whether the new type machine may be cheaper to acquire and less expensive to maintain, and may permit easier loading.*



The U. S. Army's first field artillery missile group, employing the Redstone surface-to-surface missile, will be activated at Redstone Arsenal, Huntsville, Alabama. The 40th Field Artillery Missile Group, consisting of the 217th FA Battalion (Redstone), 630th Ordnance Company, and 580th Engineer Company, will be assigned to Third U.S. Army as a part of the Strategic Army Force. The new missile group will have a strength of approximately 600 officers and men.

*Weighing about a tenth as much as industrial diesel or gas engines of comparable performance, a new light-weight gas turbine engine now is under development by the Army. A product of the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Virginia, and of AiResearch Manufacturing Company of Arizona, the unit weighs only 326 pounds. It is designed to meet requirements for a prime mover in a lightweight, high-speed 400 cycle, 100 kw engine-generator set, and other applications where portability is paramount. It can produce up to 286 horsepower under ideal conditions.*



With publication of DA Pamphlet 16-5 (Revised) *Duty-Honor-Country* and distribution of the pamphlet with related films, transparencies, and graphic aids, the first part of a full-scale revision of instructional materials of the Army's Character Guidance program has been completed. The materials were revised to identify the program more closely with the Military Code of Conduct which was formulated since inception of the Character Guidance Program ten years ago. Basic moral principles of the Code are emphasized in the new presentations.

A second cycle of training for nuclear power plant operating personnel will begin in January 1958. Training, to be conducted at Fort Belvoir, Virginia, will include a six-month basic academic course in nuclear power plant technology and six months of operational training at the Army Package Power Reactor (APPR-1). Details are contained in Circular 621-7.



*Responsibility for contract construction in Korea, Japan, Taiwan, Okinawa and the Territory of Hawaii has been vested in a new Army Engineer Division, Pacific Ocean. The new division with headquarters in Honolulu will report directly to the Army Chief of Engineers.*



The United States Continental Army Command has announced plans for Army-wide implementation of Trainfire, the new method of teaching rifle marksmanship, to be accomplished by 1959. The United States Army Infantry School and training centers throughout continental United States will build appropriate ranges designed to train the soldier to use his rifle effectively in combat. (See "Shoot Fast and Straight," July 1957 DIGEST.)

### New Names for Army Aircraft

INDIAN terms and names are now approved as popular designations for Army aircraft. Only airplanes to retain their original names are the "Bird Dog" (L-19 Cessna); "Beaver" (L-20 DeHavilland) and "Otter" (U-1 DeHavilland). The following names have been adopted.

| <i>Type and Model</i> | <i>Manufacturer</i> | <i>New Name</i>         |
|-----------------------|---------------------|-------------------------|
| H-13                  | Bell                | Sioux (Soo)             |
| H-19                  | Sikorsky            | Chickasaw (Chick-a-saw) |
| H-21                  | Vertol              | Shawnee (Shaw-nee)      |
| H-23                  | Hiller              | Raven (Ray-ven)         |
| H-34                  | Sikorsky            | Choctaw (Chock-taw)     |
| H-37                  | Sikorsky            | Mojave (Mo-ha-va)       |
| H-40                  | Bell                | Iroquois (Iro-quois)    |
| XH-41                 | Cessna              | Seneca (Sen-e-Ka)       |
| Flying Platform       | Hiller              | Pawnee (Paw-nee)        |
| L-23                  | Beech               | Seminole (Sem-i-nol)    |
| DCH-4                 | DeHavilland         | Caribou (Kar-i-boo)     |
| HPOA                  | Grumman             | Mohawk (Mo-hawk)        |

*The mission of supervising the entire pre-commission extension course program for the U. S. Army has been assigned to the U. S. Army Infantry School's Department of Non-resident Instruction. Leading to qualification for a reserve commission as a second lieutenant, the courses are open to enlisted personnel on active duty, to those in reserve components, and to civilian employees of Department of the Army. Courses heretofore were conducted at the Infantry, Medical, Signal, Provost Marshal General, Adjutant General, Chemical and Army Security Agency schools.*

The 1st Cavalry Division (Infantry) has been withdrawn from Japan and the 24th Division formerly in Korea has been redesignated as the 1st Cavalry Division. Personnel and equipment of the old 24th Division are being absorbed in the newly designated division while personnel of the 1st Cavalry Division are being assigned elsewhere. Although the 24th Division will be removed for the time being from the Army active list, its various famous regiments will be represented in other divisions of the Active Army.

## Official Notes

**CARGO TRANSPORTERS.** AR 55-166 contain general policies, statements of responsibilities and operating standards relative to use of the cargo transporter (CONEX) in the military supply system.

**NCO ACADEMIES.** AR 350-90 establish a standard pattern for the Non-commissioned Officer Academies in the U. S. Army which are designed to broaden the professional knowledge of the noncommissioned officer and instill self-confidence and sense of responsibility required for capable leadership.

**PERSONNEL PROCUREMENT.** AR 601-275 define the various recruiting agencies of the Army and set forth the responsibilities of each.

**NATIONAL MATCHES.** AR 920-30 cite statutory authority and prescribe conditions governing the National Matches which are conducted upon recommendation of the National Board for the Promotion of Rifle Practice.

**RECORDS ADMINISTRATION.** AR 345-230 govern release (together with AR 345-20) of information and records from Army files.

**LIE DETECTOR.** AR 195-21 govern utilization of the Lie Detecting Set AN/USS-2( ) used in the Criminal Investigation Program of the Military Police Corps. The device may be used as an aid but not as a substitute for approved criminal investigative techniques.

**MEDICAL INTERNSHIPS.** AR 350-220 set forth basic policies and standards for the Medical Corps program of internships, residencies, and fellowships.

**ORGANIZATION OF ARMY.** AR 10-5 set forth the functions and organization of the Department of the Army, and the general responsibilities of the heads and commanding generals of its major elements.

**RESERVE TRAINING CENTERS.** AR 140-475 establish policies, procedures, criteria, responsibilities, and guidance for selection of sites for U. S. Army Reserve Training Centers.

**CIVILIAN CAREER PLANNING.** AR 690-5 prescribe the general plan governing establishment and operation of civilian career programs within the Department of the Army.



## *Hawk Developed for Low Altitude Air Defenses*

REINFORCING the low altitude capability of air defenses, the Army has successfully developed a new missile system called the Hawk. Site selection actions for emplacement of the new weapon have already been started at various places in continental United States to complement existing Nike system defense against high level attacks.

Equipped with specially designed radars to detect and track low flying aircraft in the blind zone of conventional radars, the Hawk system uses guidance techniques that are unusually successful in hunting down and destroying any would-be attacker.

APPROXIMATELY 16 feet long and 14 inches in diameter, the Hawk missile uses a solid fuel propellant. The versatile new weapon system can operate at fixed installations or with combat troops in the field. Its mobile role will also be adopted by the U. S. Marine Corps. It can be transported on highways, or by helicopter or other aircraft.

Missile Master, the electronic system for controlling and coordinating fire of Nike anti-aircraft batteries, will also coordinate the Hawk.

Raytheon Manufacturing Company of Massachusetts is the prime contractor under Army Ordnance for development of the entire weapon system. Northrop Aircraft of California is the major sub-contractor.

*(For view of Hawk missile, see back cover.)*



**THE U. S. ARMY—A KEY TO PEACE**